Introduction

Thank you Mr. Chairman and members of the subcommittee. I appreciate the opportunity to meet with you today to discuss the Technology Administration's FY 2000 budget request. As the President noted in his October 30, 1998 signing statement that accompanied the Technology Administration Act of 1998, we are looking forward to working with the Congress on authorization legislation for the Technology Administration and its component agencies.

The Technology Administration includes the Office of the Under Secretary for Technology, the National Institute of Standards and Technology (NIST), the National Technical Information Service (NTIS), the Office of Technology Policy (OTP), and the Office of Space Commercialization. As you can see by the make-up of our organization, the Technology Administration is concerned fundamentally with the health of civilian technology in the United States.

My testimony today will focus on the global competitive environment, and address the initiatives of the Technology Administration, focusing primarily on the role of the Office of the Under Secretary and the Office of Technology Policy (US/OTP) in the context of today's global economy. I will also address the NTIS budget request in the context of the changing environment in which it operates. I will be followed by NIST Director Ray Kammer who will discuss NIST's budget request.

U.S. Economic Performance Extraordinary

The performance of the U.S. economy continues to astound the experts. We now have the longest peacetime economic expansion in history and the lowest peacetime unemployment since 1957. We have the lowest inflation rate since 1959, the lowest welfare rolls in 29 years, and we have balanced the Federal budget for the first time in 20 years. We have created 18.2 million new jobs in the last 6 years—the majority of them paying above average wages—and wages overall are rising at twice the rate of inflation. Last year's overall growth rate of 3.9 percent exceeded expectations and the fourth quarter (annualized) rate of 6 percent was sizzling.

Some people call it the miracle economy, but it is no miracle at all. Our economy is strong because we have focused on the things that contribute most to economic growth and job creation. We are rapidly building an infrastructure for a knowledge-based economy. We are increasing our investments in human capital. The United States is one of the very best places in the world to conduct commerce, with a climate that fosters innovation and business competitiveness.

Perhaps most important, we have significantly increased our national investment in research and development. Between 1994 and 1997, total U.S. R&D expenditures climbed by more than 13 percent in real terms, while industry increased its real investment in R&D by nearly 25 percent.

Technology Driving Economic Growth, Job Creation, Productivity Improvements

More than ever before, technological leadership is vital to the national interest of the United States. Our ability to harness the power and promise of leading-edge advances in technology will determine, in large measure, our national prosperity, security and global influence. Technology underpins our fastest growing industries and high-wage jobs, and provides the tools needed to compete in every business today.

Leading economists now identify technical progress as a major, if not the single most important, factor in sustained economic growth, accounting for as much as one half of U.S. economic growth in the past 50 years. Technology is expected to continue to fuel our growth.

In recent testimony before Congress, Federal Reserve Chairman Alan Greenspan noted, "The current economic performance, with its combination of strong growth and low inflation, is as impressive as any I have witnessed in my nearly half century of daily observation of the American economy." He then attributed much of the economy's success to productivity improvements resulting from technological advance: "Signs of a major technological transformation of the economy are all around us, and the benefits are evident not only in high-tech industries but also in production processes that have long been part of our industrial economy." In particular, Chairman Greenspan pointed to the accelerating expansion of computer and telecommunications technologies as a force that should appreciably raise our standard of living in the 21st century.

No Time to Rest

But we must not allow our success to lull us into a false sense of economic security. The world is changing rapidly and global markets demand constant innovation and improvement. In the New Economy, benefits will accrue to companies and countries that continue to invest, innovate and compete; unrelenting market forces will not be kind to those that do not.

Not long ago, the emergence of powerful new competitors and resurgence of others raised great concerns about America's position of global economic leadership. So we did what Americans have done throughout our Nation's history—we redoubled our efforts, made the tough choices, and got down to the business of competing. As a result, today we are out in front of the global pack and the American people are reaping the benefits of our reinvigorated competitiveness.

We must not let up. Often this competition has been compared to a race—with winners and losers determined at the finish line. In such a race, winners rest after the victory. But in this global competition, there is no finish line—winners and losers are determined along a course without end—and there is no rest for the winners. To maintain our economic leadership—and the prosperity it brings—we must maintain our vigilance, prepare for the challenges of the 21st century, and invest in our future.

U.S. Investments in Science, Technology & Innovation Continue to Pay Large Dividends

Federal research has given birth to new industries, such as computers and biotechnology, and propelled U.S. firms into leadership positions in other industries, including aerospace, telecommunications, and pharmaceuticals.

These contributions were made possible, in large measure, by the dominance of U.S. government R&D expenditures as a share of global R&D investment. In the period following World War II, the United States accounted for more than 70 percent of total global R&D expenditures, with Federal R&D spending accounting for most of the U.S. investment. The relative size of the Federal investment meant that the U.S. government could drive technology development through its investments to meet national needs—primarily in defense, then later in space and in health. In effect, U.S. science and technology policy was defined by where the Federal government spent its R&D dollars.

Declining Share of Global R&D Increases Importance of Federal Policy for Promoting U.S.

Competitiveness

Federal research continues to yield important advances in nearly every field of science and technology, delivering substantial benefits to the economy. However, the role of the Federal government as the dominant driver of global technological innovation has waned in proportion to its relative share of global R&D. Today, the United States accounts for less than a third of total global R&D spending. The U.S. private sector accounts for nearly two-thirds of the total U.S. investment, and the Federal government accounts for only about 30 percent. Even more striking, Federal civilian R&D spending—$39.8 billion in the President' FY 2000 budget—accounts for less than one-fifth of total U.S. R&D.

Even in this environment, the Federal government still plays a critical role in the U.S. R&D enterprise, including advancing promising new emerging and enabling technologies—in partnership with U.S. industry—that offer substantial economic and social returns to the Nation. This, in fact, is the very role of the Advanced Technology Program that Director Kammer will address in detail today. In addition, the President's budget includes increased investments in critical civilian science and technologies areas, including health, high performance computing, environment, agriculture, space, energy, and education, as well as multidisciplinary, multi-agency efforts such as the Partnership for a New Generation of Vehicles which I will address in more detail later in my remarks.

It is important to note, however, that with the Federal government's decreasing share of both U.S. and global R&D spending, technology policy is an increasingly important tool in the Federal government's ability to promote U.S. competitiveness and economic growth through research and development, and it is the raison d'être of the Technology Administration's Office of the Under Secretary/Office of Technology Policy (US/OTP).

US/OTP is charged by Congress under the Stevenson-Wydler Act with developing and advocating Federal policies that maximize technology's contribution to national economic growth, U.S. industrial competitiveness, the creation of high wage jobs, and a higher standard of living and quality of life for all Americans—a mandate that mirrors this committee's responsibilities.

US/OTP: Advocate for the U.S. Innovation Enterprise

In the broadest sense, US/OTP serves as the advocate for the U.S. innovation enterprise. We serve as a focal point for key issues that matter to industry's ability to keep our enterprise healthy and vibrant. A hallmark of US/OTP's efforts in this regard is our "Listening to Industry" approach. By maintaining a dialogue with industry and other key players in the U.S. innovation system, US/OTP is able to effectively serve as a forceful advocate for improvements in the Nation's business climate for innovation. To this end, US/OTP conducts research and analysis, convenes key parties, spotlights critical issues, stimulates debate, identifies solutions, and advocates for improvements in U.S. policy, laws, and regulations. During FY 2000 we will concentrate on several initiatives to fulfill our mission:

- Lately we've devoted much effort to helping the Nation meet the growing demand for skilled information technology workers. Over the past year, we have conducted town meetings across the Nation, and participated in a wide range of fora seeking to address this challenge. US/OTP's analytical and advocacy work on this issue has catalyzed public and private efforts to address the challenges, including unprecedented cooperation among the Commerce, Labor, and Education Departments. Our IT web site, launched in August of 1998, received more than 660,000 hits in its first four and one-half months. Through the site, which lists more than 180 reference sources of

various types, visitors can learn about high-tech work force initiatives and network with other people who can offer insight and opportunities for collaboration. US/OTP will be producing our third report on this issue later this year reflecting what we have heard at our town meetings, identifying best practices, and examining Federal policy responses to the challenge which we will address in FY 2000. We believe there are several pressure points in information technology work force development where government leadership could make a difference. In FY 2000, we will focus our efforts on areas such as: collecting and disseminating information on innovative IT training and work force development solutions, including further development of our popular "Go for IT" web site; skills mapping efforts to identify worker pools that are good candidates for IT jobs and how to move them rapidly into these careers; encouraging expanded use of telecommuting and teletraining; and encouraging young Americans to pursue technical careers.

- The research and analysis we have conducted under our *Meeting the Challenge: U.S. Industry Faces the 21st Century* series of industry competitiveness assessments has created a substantial base of knowledge and expertise from which US/OTP, other Executive Branch agencies, and Congress can call upon in the development of public policies designed to stimulate U.S. competitiveness. To date, US/OTP has produced reports on the competitive status of a wide range of key American industries—chemicals, biotechnology, automobile manufacturing, steel, and environmental—to the critical acclaim of industry leaders and government policymakers.

  Two new benchmarking studies, due to be completed this year, will identify key areas for policy analysis and development in FY 2000. These new studies are especially important, since they deal with emerging industries where information needed for business and government decision making is often inadequate. Areas of attention include:
  - space commerce, where the Commerce Department has committed to a leadership role in encouraging the development of this promising emerging industry; and
  - electronic commerce, where a wide range of business and consumer issues are emerging with implications for government policy.

- U.S. industry has long encouraged US/OTP to play a stronger role in assessing the effect of economic, regulatory, trade, and other policies on the U.S. business climate for innovation, and in identifying policy barriers to technology development and commercialization. In the past several years, industry has identified policies such as securities litigation, product liability reform, and antitrust as areas in need of examination for their effect on innovation. In FY 2000, US/OTP would focus on business climate issues such as: educating Federal government leaders who do not work in technology policy on how policies in their areas of responsibility affect innovation, and working with the private sector to analyze issues affecting the availability of capital for technology development and commercialization, including the extent to which a technology funding gap occurs between early stage capital and product development which may significantly inhibit the innovation process. We are also exploring ways to improve the public's understanding of the vital role technology plays in the U.S. economy.

- US/OTP's focus on competitiveness made the agency the logical choice to serve as government secretariat for the Partnership for a New Generation of Vehicles initiative. The global competition to produce highly fuel efficient vehicles has gone into overdrive, with companies around the world announcing new technological advancements toward this goal on a regular basis. With this in mind, US/OTP expects FY 2000 to be a banner year for PNGV. In 2000, each of the participating auto

companies will unveil their PNGV concept demonstration vehicle, and will be well on the way to producing production prototypes in 2004 as envisioned.

The rapid development and deployment of new automotive technologies, together with the expected introduction of new and reformulated fuels, has the potential to revolutionize the global auto industry, with significant repercussions for America's car companies and the automotive supplier base. In large measure, neither the supplier base nor the states are aware of the magnitude of the technology changes coming in the auto industry and the profound impact these changes will have upon their economic success. In FY 2000, US/OTP will build on existing programs within the Technology Administration to help the automotive supplier base—and states whose economies are linked closely to the automotive sector—prepare for these changes and to seize the opportunities that will emerge.

- One of the mechanisms that US/OTP will rely on to this end is our U.S. Innovation Partnership (USIP) initiative, whose purpose is to build stronger relationships between Federal and state efforts to promote technology-based economic development. USIP seeks to leverage the resources of U.S. industry; academia; and Federal, state, and local governments and to create synergy among complementary programs.

  This past year, USIP successfully elevated the profile of technology's role in state and local economic development among the Nation's governors and state legislators. For the first time, technology was the central theme at the National Governors Association's annual conference, and the role of technology was highlighted at the National Conference of State Legislatures annual meeting. At the NGA meeting, in addition to plenary sessions focused on technology, the Committee on Economic Development and Commerce featured a report on USIP by the Lead Governors on Technology. Further, the conference included a unique State Leadership in Technology Exposition including displays of state best practices in using technology to improve the lives of all Americans.

  In partnership with the Science and Technology Council of the States, USIP also convened two Washington, DC roundtables. The first roundtable stimulated a productive dialogue among former state science and technology directors and Federal S&T agency heads and program directors on new frontiers for partnership activities. At second roundtable, state science and technology directors, economic development directors and elected officials highlighted their states' S&T activities, exchanged ideas and information, and discussed best practices.

  On the policy front, USIP efforts have also yielded recommendations from both Federal and state perspectives for improving program operations of the Small Business Innovation Research (SBIR) program, including input to the upcoming SBIR reauthorization. While the consensus building process is still in progress regarding the specifics of these joint recommendations, it is clear that the states have a strong interest in the SBIR program and are joining their Federal counterparts in determining their appropriate respective roles in the full span of program activities--from initial awareness to commercialization.

- FY 2000 will be an evaluation year for US/OTP's Experimental Program to Stimulate Competitive Technology (EPSCoT) initiative, which is designed to foster development of indigenous technology assets in states and regions traditionally under represented in Federal R&D funding in order to foster technology-based regional economic growth. By FY 2000, EPSCoT will have conducted two grant

competitions and most of the projects funded under the first grant competition will be complete or nearing completion. In FY 2000 we will conduct a full-scale program evaluation—assessing the management, direction, and effectiveness of the program in meeting its stated objectives, as well as conducting a current needs assessment.

- US/OTP is continuing its leadership role in analyzing and strengthening Federal agency efforts to meet the goals of the Federal technology transfer legislation of the 1980s. Charged with producing biennial reports to the Congress on this subject, US/OTP's 1999 report will help guide our FY 2000 activities in this area. In addition to the report, we will convene a series of roundtables with industry representatives to gain a better understanding of their experiences in working with Federal labs. The report and these roundtables will lay the groundwork for recommendations on improving agency work practices and, if needed, new legislative initiatives.

- Also in fulfilling our leadership role in the area of technology transfer, and in partnership with the National Science and Technology Council's Committee on National Security, we are examining the adequacy of procedures when Federal labs enter into international cooperative research and development agreements. We are analyzing the implications such cooperation may have on effective protection of intellectual property rights, as well as on U.S. national security and global competitiveness.

- Our research and analytical capabilities extend to the international front as well. US/OTP monitors and reports on the science and technology plans, programs and policies of other nations; represents U.S. industry's interests in international science and technology fora, such as the OECD and APEC; and provides advice and counsel to other Federal agencies whose negotiations with other nations on science and technology issues could affect the competitiveness of U.S. industries.

  Several analyses to be published this year are expected to identify issues that will require government's attention in FY 2000, as well as identifying opportunities and challenges for U.S. businesses in the global marketplace. Areas of analysis include:

  - the role of information technology in the development strategies of Asian nations, where business competitiveness issues are a key focus;
  - science, technology, and innovation in the People's Republic of China, an important examination of policies in a country expected to be a major force in the 21st century global economy; and
  - the globalization of R&D, which is part of our continuing efforts to understand the implications of the global flow of technology and R&D investment.

  In FY 2000, we will continue to focus attention on understanding Asia's growing role in R&D and technology, and exploring the burgeoning technology capabilities in Latin America.

Our budget request for FY 2000 is explained in the Budget Highlights which has been submitted to the Committee. I request that it, along with a brief list of recent US/OTP accomplishments, be included in the record.

NTIS: Appropriation Needed to Support Statutory Functions

As the Committee has no doubt noted, the President's FY 2000 budget includes a request for $2 million for the National Technical Information Service.

Over the past half-century, NTIS has amassed a collection that consists of more than three million individual scientific, technical, and engineering titles. Including a title in the NTIS collection entails costs associated with acquiring a product; abstracting, cataloging, and indexing the title so that it can be identified; merging it into NTIS' permanent bibliographic database; and physically storing it or scanning it into an electronic image for electronic storage.

The appropriation request for NTIS is necessary to partially cover costs associated with these functions. The organization of technical knowledge in easily retrievable form benefits NTIS' current customers, and ensures the permanent preservation of the taxpayers' $70 billion annual investment in research and development for future generations of researchers and the public at large.

NTIS cannot afford to subsidize the entire cost associated with the collection, organization and preservation of technical information through its projected 2000 sales. Losses have been incurred in the Clearinghouse where the organization and preservation functions reside. These losses have eroded NTIS' retained earnings to the point where further losses will place the agency on the verge of deficiency. The cost associated with order processing, duplicating and disseminating information products to customers will continue to be funded through sales.

NTIS has taken strong measures to increase revenue and reduce costs. It has undergone a reduction-in-force and now has 321 employees, down from 390 at the beginning of FY 1997. It has made significant investments to modernize its facilities and increase productivity. However, fixed costs remain relatively constant.

The appropriation request will help to ensure NTIS remains financially viable through FY 2000. We look forward to working with this Committee to resolve all issues concerning the future of NTIS.

Conclusion

In summary, Americans and American business are doing well—and we are doing well, in large measure, as a result of our national investments in science and technology, and the innovation and competitiveness they yield. In this perpetual marathon that is global competition, now is the time to strengthen our national efforts. We must prepare ourselves to seize new opportunities and create fertile ground for economic growth—with a healthy business climate, a modern infrastructure, a world class work force, and a strong base in science and technology. Thank you.

Testimony of

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before the

U.S. Senate

Commerce, Science, and Transportation Committee

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